Data serving for ASIRI participants

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LONG-TERM GOALS

To disseminate the planning and execution of ASIRI observational and experimental plans, as well as observational and remote sensing data for field studies amongst the ASIRI PIs and their OMM partners. To evaluate air-sea flux products for the Bay of Bengal region.

OBJECTIVES

1) Providing shore support for ASIRI-OMM field studies; password protected repository for all ASIRI-OMM cruises and activities.
2) Evaluating the Reanalysis Air-Sea fluxes against the actual measurements (flux mooring and ship based).

APPROACH

This grant provides support for PhD student Jared Buckley. Using the project support, the UMass Dartmouth group (PI along with PhD student Jared Buckley and undergraduate student Patrick Pasteris) has setup the password protected secure ASIRI PI server at https://asiri.umassd.edu which has allowed (a) ground based shore support for all ASIRI cruises in 2013, 2014 and 2015. (b) processed datasets for ASIRI-OMM PIs (c) real-time asset tracking during major experiments (d) storage of all the presentations at various ASIRI PI science review meetings.

Jared Buckley has evaluated the Bay of Bengal fluxes from field studies against a number of re-analyses (ECMWF, NCEP-1 and NCEP-2, NASA MERRA), and is currently comparing the fluxes from 18N Air-Sea flux mooring against the reanalyses. Undergraduate student Patrick Pasteris has mainly been funded by internal UMass Dartmouth funding with a small contribution from this grant.

The following activities were undertaken this year.

(i) Shore support for June 2014 Revelle cruise and August 2014 Nidhi cruise.
(ii) Shore support for August-September 2015 crusie on Revelle.
(iii) Inter-comparison of R/V Revelle and WHOI mooring based air-sea fluxes with atmospheric fluxes from reanalyses.

RESULTS

1. Shore support for August 2014 Nidhi cruise, August-September 2015 Revelle and Nidhi cruises: Jared Buckley, Patrick Pasteris and Amit Tandon at UMass Dartmouth provided shore support using a multitude of remote sensing data and oceanic and atmospheric model output as well as blended products, which were made available to the chief scientists and the scientists onboard Revelle and Nidhi. An example of this is shown in Fig. 1, which shows a composite image that combines the sea surface height anomaly maps with currents from the OSCAR product and sea surface salinity from the Aquarius for the August 2014 Sagar Nidhi cruise. The fresh water from the Ganges and Brahmaputra rivers in the north can be seen in the Aquarius contours near 20N. The eddy centered near 19N 88E was sampled by the R/V Sagar Nidhi during its August 2014 cruise.

   Another example of shore support is shown for the August-September 2015 cruise. Figure 2 shows real time Google Earth asset tracking (top panel) and drifter SSS with R/V Revelle SSS from bow TSG (bottom panel). The asset tracking system provides real time access to asset and ship positions along with trajectories, speed, and heading. The system also provides surface data for all data reporting assets (drifters, ships, etc) to allow for quick, real time awareness of SSS and SST over sampled areas.

   This information system has been heavily used for all of the ASIRI-OMM cruises, and it has provided planning support before the cruises, as well as real time support during the cruises. This password protected secure server also hosts the science review presentations for all of the ASIRI science reviews, thus enabling collaboration between scientists from different institutions in USA and India.

2. Inter-comparison of 18N Air-Sea Flux mooring with atmospheric fluxes from reanalysises and R/V Revelle based air-sea fluxes with atmospheric fluxes from reanalyses. : The ship based fluxes for November-December 2013 winter Monsoon season have been compared with following reanalysis products; MERRA, ECMWF ERA-Interim, NCEP/DOE, and NCEP/NCAR, for the grid points closest to Revelle's location. Amongst the re-analysis products, MERRA and ECMWF ERA-Interim have lower errors.

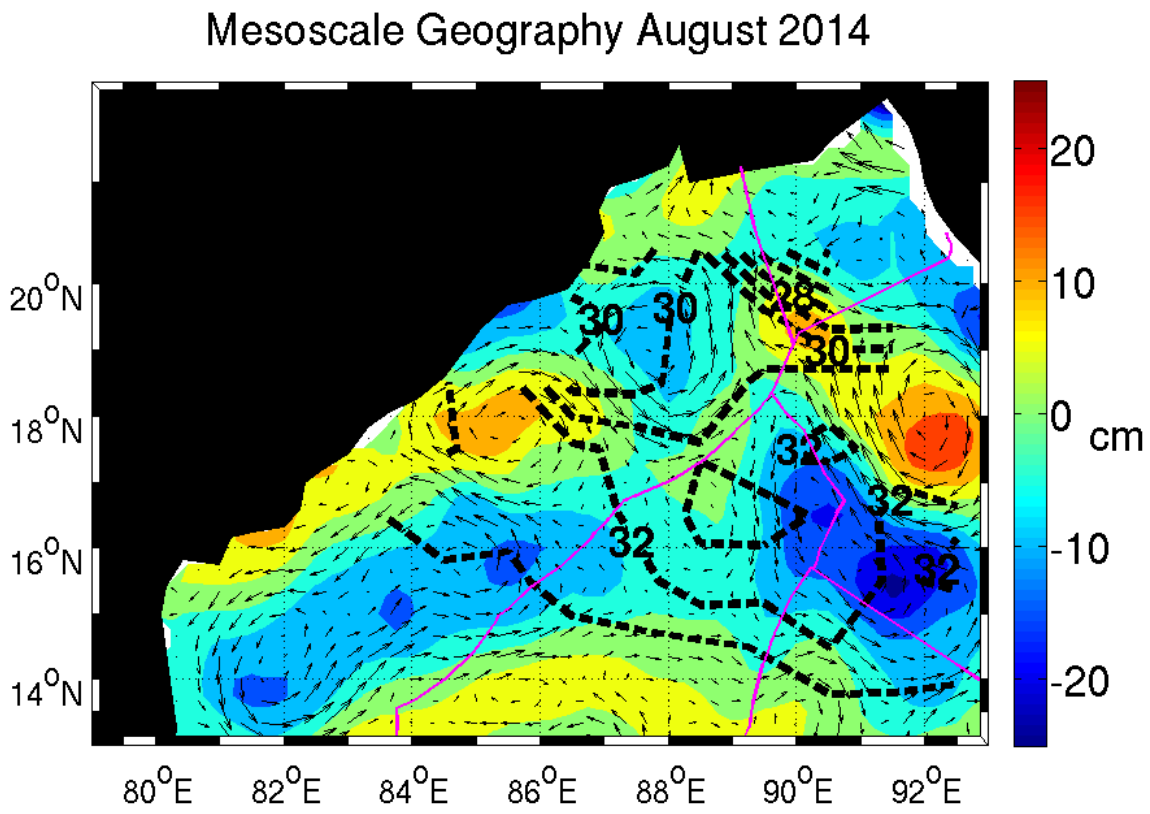
   Extensive comparisons of fluxes measured by WHOI mooring have been done from December 2014 to August 2015 comparing them to the MERRA reanalyses. Figure 3 shows the inter-comparison of fluxes from the air-sea flux WHOI mooring at 18N and atmospheric reanalysis air-sea fluxes from NASA MERRA for a week in April 2015. It also shows the Indian satellite INSAT 3D visible satellite image (April 24, 2015) with select WHOI mooring atmospheric and air-sea fluxes compared the NASA MERRA reanalysis. During this period in April, three distinct drops in temperature and humidity occurred associated with a large

convective system over the Bay of Bengal, modifying the air-sea heat exchange. The MERRA reanalysis fails to produce these events, leading to the poor estimation of heat fluxes during this period.

PUBLICATIONS

None

FIGURES



<u>Figure 1:</u> SSHA from CCAR (color, cm), currents from OSCAR (quiver, m/s), SSS from Aquarius (weekly, black dashed contours, psu), and the EEZ (magenta line). The mesoscale geography of the Bay of Bengal during late August 2014. The fresh water from the GPM rivers in the north can be seen in the Aquarius contours near 20N. The eddy centered near 19N 88E was sampled by the R/V Sagar Nidhi during its August 2014 cruise.

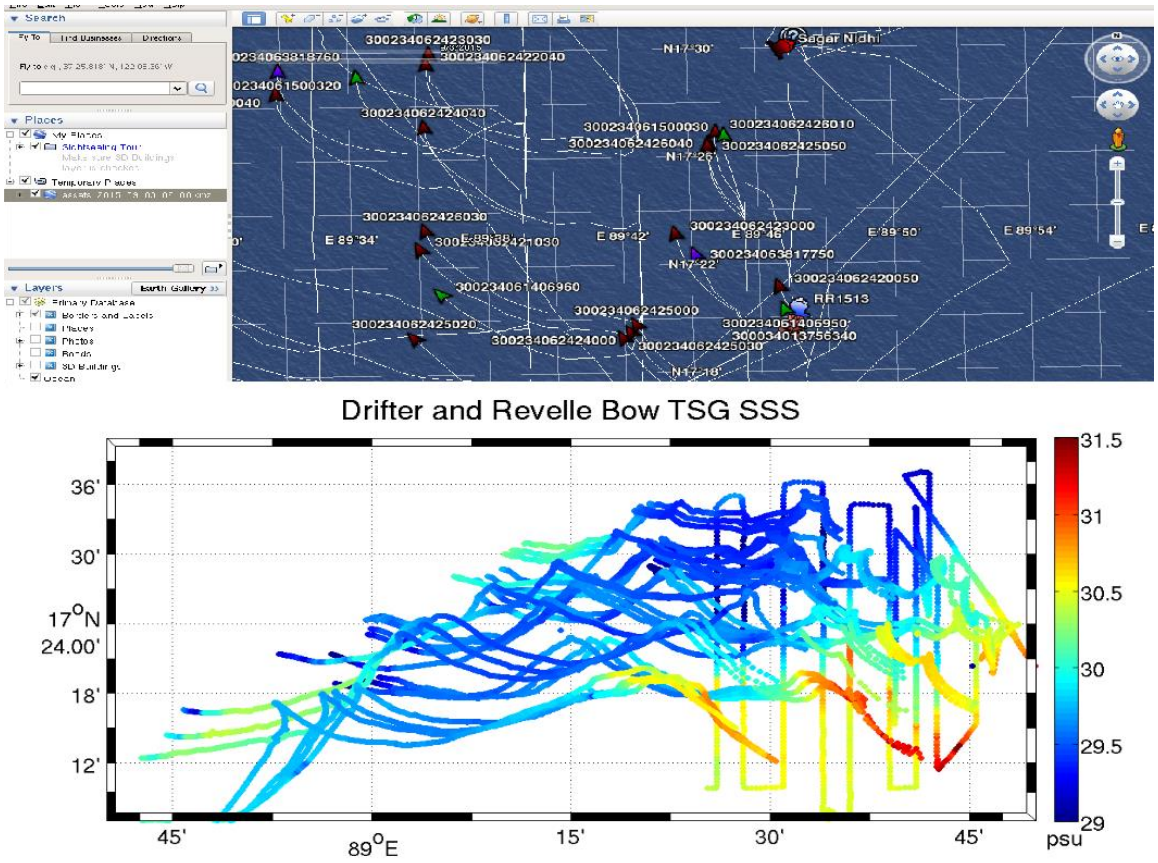


Figure 2: Realtime Google Earth asset tracking for August/September 2015 cruise (top panel) and drifter SSS with R/V Revelle SSS from bow TSG (bottom panel). The asset tracking system provides realtime access to asset and ship positions along with trajectories, speed, and heading. The system also provides surface data for all data reporting assets (drifters, ships, etc) to allow for quick, realtime awareness of SSS and SST over sampled areas.

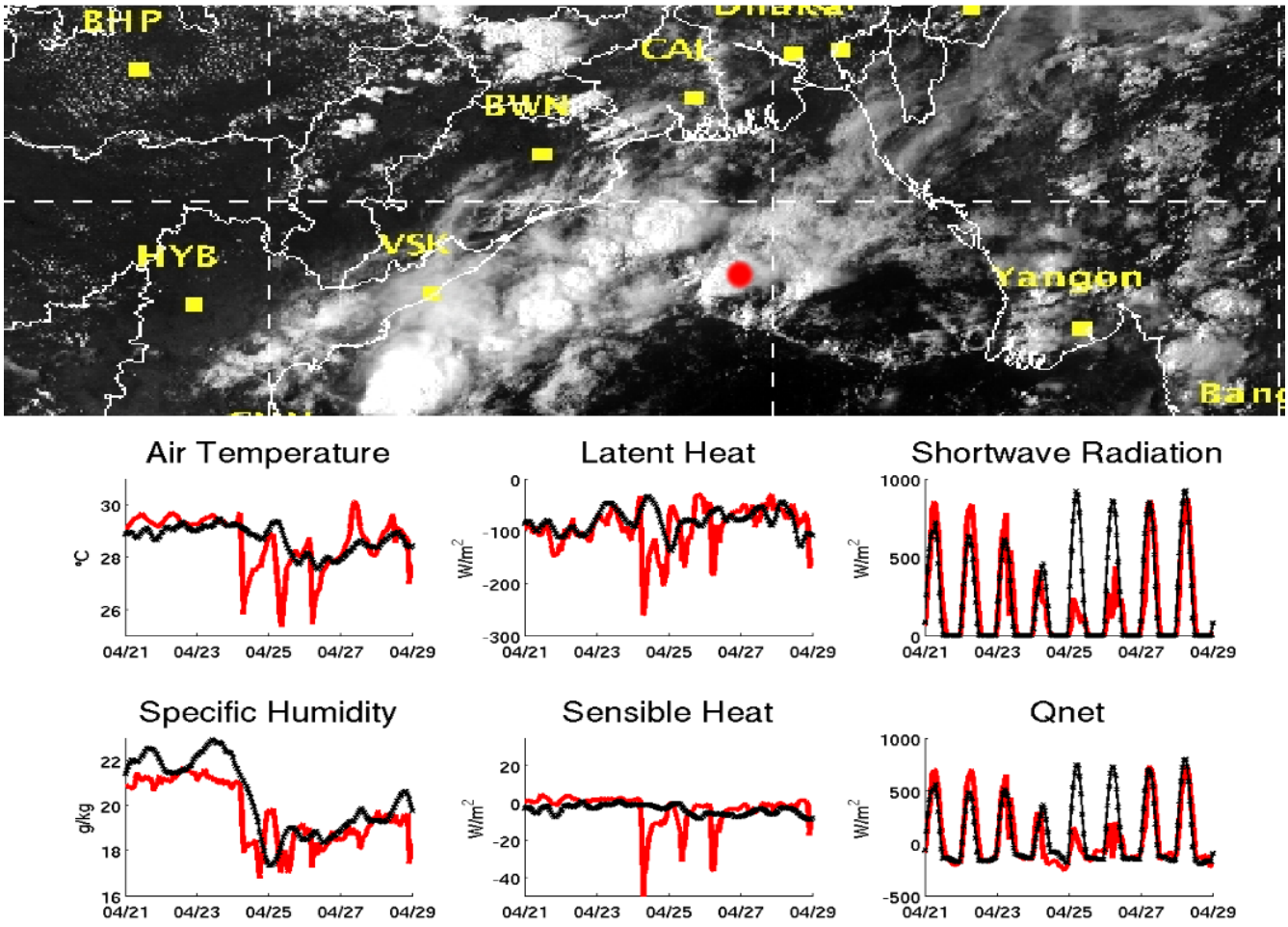


Figure 3: INSAT 3D visible satellite image (April 24, 2015) with select WHOI mooring atmospheric and air-sea fluxes compared to the NASA MERRA reanalysis. During this period in April, three distinct drops in temperature and humidity occurred associated with a large convective system over the Bay of Bengal, modifying the air-sea heat exchange. The MERRA reanalysis fails to produce these events, leading to the poor estimation of heat fluxes during this period.